

SOME PARASITES AND PREDATORS OF FRUIT PESTS
IN THE PACIFIC NORTHWEST

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For more than forty years the Department of Agriculture's fruit insects laboratories in the Pacific Northwest have been collecting information on the parasites and predators of insects and mites of economic importance. Specimens were collected or reared at Wenatchee, Washington, from 1914 to 1916, in the area around Portland, Oregon, in 1917 and 1918, and at Yakima, Washington, since that time. About 90 species have been determined, many of them new to science at the time they were collected. The determinations were made by specialists in the Department of Agriculture and the U.S. National Museum, including Banks, Caudell, Cushman, Gahan, Girault, Heidemann, Knab, Muesebeck Rohwer, Sabrosky, Sailer, Schwartz, and Walton.

These parasites and predators are listed below under each host in the order in which they commonly appear in systematic lists. Life history and other data have been published for some of these beneficial insects, and reference is made at the appropriate places to such publications.

Acarina (including *Bryobia proetiosa* Koch., *Metatetranychus ulmi* (Koch), *Eotetranychus carpini borealis* (Ewing), *Tetranychus mcdanieli* McG., and *T. telarius* L.) The occurrence and abundance of predators are discussed in (10).

Conwentzia sp. Coniopterygidae. Clark County, Wash.

Scolothrips sexmaculatus (Perg.). Thripidae, Yakima, Wash.

Typhlodromus spp. Phytoseiidae. Also called *Seius* in older literature.

Mediolata mali (Ewing). Raphignathidae. Yakima.

Orius insidiosus (Say). Anthocoridae. Yakima.

Stethorus picipes Casey. Coccinellidae. Yakima.

Androloma mac-cullochi similis (Stretch.) Forester moth.

Gravenhorstia sp. Ichneumonidae. Wenatchee, Wash.

Ametastegia glabrata (Fall.). Dock sawfly. Parasites and percentage of parasitization mentioned in (4).

Eurytoma sp. Eurytomidae. May be secondary. Wenatchee.

¹ Retired.

Trichogramma minutum Riley. Trichogrammatidae. Egg parasite. Wenatchee.

The following ichneumonidae, all from Wenatchee: *Mastrus smithii* (Pack.) Cush. and *Hoplocryptus notatus* (Prov.), *Cubocephalus canadensis* (Prov.), *Scambus pterophori* (Ashm.), *Hympanblyus albopictus* (Roh.), *Cubocephalus erythropus velox* (Cress.), and *Bathythrix claviger* (Tasch.).

Anacamptis fragariella Busck. Western strawberry leafroller.

Agathis cincta (Cress.). Braconidae. Northport, Wash.

Aphididae (including *Anuraphis roseus* Baker, *Aphis cerasifoliae* Fitch, *A. pomi* Deg., *Hyalopterus arundinis* (F.), *Macrosiphum artemisiae* (Fonsc.), *Monellia caryae* (Monell), *Myzus cerasi* (F.), and *M. persicae* (Sulz.)). Some of the predators listed below are discussed in (7).

Chrysopa plorabunda Fitch. Chrysopidae, Wenatchee.

C. majuscula Banks. Chrysopidae. Salem, Oregon.

Kimminsia disjuncta (Banks). Hemerobiidae. Salem, Oregon.

Anthocoris borealis Dallas. Anthocoridae, Wenatchee.

Camptobrochis brevis Uhl. and *C. nebulosus* Uhl. Capsidae. Wenatchee.

Podabrus tomentosus (Say). Lampyridae. Wenatchee.

Metasyrphus arcuatus (Fall.) and *Syrphus opinator* O.S. Syrphidae. Wenatchee.

Lasiophthicus pyrastris (L.) Syrphidae. Wenatchee.

The following Coccinellidae, all from Wenatchee: *Adalia annectans* Cr., *A. bipunctata* (L.), *Coccinella 5-notata* Kby., *C. 9-notata* Hbst., *Cycloneda sanguinea* (L.), *Hippodamia convergens* Guer., *H. lecontei* Muls., *Hyperaspis* sp., and *Scymnus lacustris* LeC.

Aphis gossypii Glov. Melon aphid.

Aphidius (Lysiphlebus) testaceipes (Cress.). Braconidae. Wenatchee.

Arachnida. Spiders.

Tromatobia rufopectus (Cress.). Ichneumonidae. Egg predator parasite. Wenatchee.

Archips argyrospila (Wlk.). Fruit-tree leaf roller.

Podisus modestus Dall. Pentatomidae. Wenatchee.

Stomatolydella infernalis Tns. Larvaevoridae. Kennewick, Wash.

Aplomya caesar (Ald.). Larvaevoridae. Kennewick and Wenatchee.

The following ichneumonidae: *Horogenes pterophorae* (Ashm.), *Horogenes eureka* (Ashm.), and *Itopectis 4-cingulatus* (Prov.), from Wenatchee, and *Exochus* sp. from Kennewick.

Archips rosaceana (Harr.). Oblique-banded leaf roller.

Glypta simplicipes Cress. Ichneumonidae. Ellensburg, Wash.

Ascogaster quadridentata Wesm. Codling moth parasite. See (9).

Perilampus fulvicornis Ashm. Parilamidae. Yakima.

Kimminsia disjuncta (Banks). Brown lacewing.

Anacharis sp. Figitidae. Salem, Oregon.

Carpocapsa pomonella (L.). Codling moth. Introduction of parasites discussed in (9).

Ascogaster quadridentata Wesm. and *Agathis conspicuus* (Wesm.) Braconidae. Introduced into the Yakima Valley.

Mastrus pilifrons (Prov.) Ichneumonidae. Wenatchee.

Pimpla sanguinipes Cress. Ichneumonidae. Yakima.

Scambus hispae (Harr.) Ichneumonidae. Wenatchee.

Trichogramma minutum Riley. Trichogrammatidae. Egg parasite. Wenatchee and Yakima.

Chrysopidae. Lacewings.

Isodromus niger Ashm. Encyrtidae. Yakima County.

Keonolla confluens (Uhler). Sharpshooter.

Ufens niger (Ashm.). Trichogrammatidae. Yakima.

Coccinella 5-notata Kby. Lady beetle.

Tetrastichus melanis Burks. Eulophidae. Wenatchee.

Conwentzia sp. Dusty wing.

Dendrocerus conwentziae rufus Gahan. Ceraphronidae. Clark County, Wash.

Corythucha spp. Lacebugs.

Podisus modestus (Dall.). Pentatomidae. Clark County.

Orius tristicolor (White). Anthocoridae. Clark County.

Perilitus sp. Lady beetle parasite.

Nabis ferus L. Nabidae. Wenatchee.

Epicallima coloradella Walsh. Scavenger moth.

Idecthis sp. and *Itoplectis 4-cingulatus* (Prov.) Wenatchee.

Eriosoma lanigerum (Hausm.). Woolly apple aphid. Predators discussed in (7). Introduction of *Aphelinus* discussed in (1), (2), (3), (6),

(7), (12), and (13).

Chrysopa plorabunda Fitch and *C. majuscula* Banks. Chrysopidae. Wenatchee.

Camptobrochis nebulosus Uhl. Capsidae. Wenatchee.

Adalia bipunctata (L.) and *Coccinella 5-notata* Kby. Coccinellidae. Wenatchee.

Aphelinus mali (Hald.). Eulophidae. Introduced into Pacific Northwest. The following Syrphidae, all from Wenatchee: *Eupeodes volucris* O. S., *Metasyrphus arcuatus* (Fall.), *Syrphus opinator* O. S., and *Scaeva pyrastris* (L.).

Lithophane spp. Green fruitworms.

Apanteles sp. Braconidae. Yakima.

Gymnonychus californicus Marl. Pear leafworm. Percentage of parasitism mentioned in (11).

Cleptes provancheri Aaron (?). Cleptidae. Wenatchee.

- Hippodamia convergens* Guer. Convergent lady beetle.
Perilitus sp. Braconidae. Wenatchee and Yakima.
- Hyphantria cunea* (Drury). Fall webworm.
Habrocytus sp. Pteromalidae. Portland.
- Lithocolletis crataegella* (Clemens). Apple leaf blotch miner.
Sympiesis rex Grlt. Eulophidae. Salem, Oregon.
- Lithocolletis tremuloidiella* (Braun). Aspen blotch miner.
Sympiesis sp. Eulophidae. Spokane.
- Zotheca tranquilla* Grote. Stalk borer.
Hypopteromalus percussor Grlt. Pteromalidae. May be secondary. Wenatchee.
Glypta simplicipes Cress. and *Scambus alboricta* (Cress.). Ichneumonidae. Wenatchee.
- Malacosoma pluviale* (Dyar). Western tent caterpillar.
Rogas sp. Braconidae. Clark County.
Hypopteromalus percussor Grlt. Pteromalidae. May be secondary. Wenatchee.
Hyposoter fugitivus pacificus Cush. Ichneumonidae. Wenatchee.
- Pachynematus* sp. Sawfly
Ctenochira extricata (Davis). Ichneumonidae. Wenatchee.
- Pandemis pyrusana* (Kearf.) *Pandemis* moth. Parasitism mentioned in (8).
Nemorilla floralis (Fall.). Laraeoridae. Yakima County.
Horogenes sp. Ichneumodidae. Yakima County.
- Papilio bairdii oregonia* Edw. Swallowtail.
Apanteles lunatus (Pack.). Braconidae. Wenatchee.
- Phalaenids*. Cutworms. Discussion of digger wasp and its inquilines in (5).
Podalonia luctuosa (Smith). Sphecidae. Yakima.
The following Sarcophagidae live as inquilines on the sphecid larvae:
Hilarella hilarella (Zett.), *Metopia leucocephala* (Rossi) and *Taxigramma heteroneura* Mg.
- Phenacoccus* sp. Mealybug.
Lygocerus sp. Ceraphronidae. Hyperparasite. Yakima County.
varhopalus sheldoni Ashm. Encyrtidae. Okanogan County, Wash.
- Psylla pyricola* Foerst. Pear psylla.
Anthocoris borealis Dallas. Anthocoridae. Entiat, Wash.
A. musculus (Say). Anthocoridae. Yakima County.
- Nematus mendicus* Walsh. Cottonwood sawfly.
Ctenochira sp. Ichneumonidae. Yakima.
- Rhagoletis cingulata* (Loew). Cherry fruit fly.
Trybliographa sp. Figitidae. Salem, Oregon.
- Sanninoidea exitiosa graefi* (Hy. Edw.). Peach tree borer.
Cryptus tejonensis Cress. Ichneumonidae. Clark County.

Scolytus rugulosus (Ratz.). Shot-hole borer.

Cheiopachus colon (L.), and *Rhaphitelus masculatus* Wlk. Pteromalidae, Yakima.

Spilonota ocellana (D. and S.). Eye-spotted bud moth.

Horogenes pterophorae Ashm. Ichneumonidae. Wenatchee.

Agathis annulipes (Cress.) Braconidae. Wenatchee.

Syrphids. Syrphus flies.

Diplazon tibiatorius (Thumb.), *D. pectoratorius* (Thumb.), *Syrphoctonus decoratus* (Cress.), and *S. maculifrons* (Cress.). Ichneumonidae. Wenatchee.

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